Media theory and web-based groups as social systems

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Introduction

This chapter consists of four sections. The first section analyses the relationship between consciousness and social systems, discussing how individual thoughts and communication are connected, influencing each other without being able to control each other. The second section develops an interdisciplinary approach which refers to phenomenological philosophy, theory of forms, second order cybernetics and the theory of autopoietic systems, describing a socio-evolutionary process where new media alter the societal capacity to handle complexity in time and space.

In sections 3 and 4, the article takes a micro-level perspective by applying the theoretical framework build in sections 1 and 2 to concrete social formations (groups in social networks), observed as self-organizing interactive systems. In particular, the article takes on web-based groups in the social networks, observing them as: 1) bounded interaction systems, as forms in the medium of the social networks, organized as tight couplings of elements, users' profiles, that are loosely coupled in the medium, 2) social systems that produce themselves as the output of their own operations, creating a border of meaning by condensing a distinction between actual communication and possible communication.

In this way, it will be possible to analyse how these web-based but nevertheless concrete social formations make a border of meaning, how they reproduce it, and what possibilities it has for the communication in the groups. This, at the same time, will count as an example of the situation of the individual in the modern society, where there is always a border of meaning when we want to belong to the social that determines what we can observe, and say.

1. Structural coupling between consciousness and communication

1.1 Consciousness as an autopoietic system

Internalization can be observed if an individual is considered a recipient of knowledge coming from society. In recent years, the idea of internalization of knowledge by an individual who is considered a recipient of inputs coming from society has been challenged by constructivist epistemology, that understand knowledge of reality as a construction performed by an observer. The problem is, what is the individual who creates knowledge? Or, in other words, what is a consciousness that creates its reality?

In order to discuss these questions, it would be useful to understand consciousness as a system. In general terms, a system is defined on the basis of the operation that differentiates it from its environment; a system "happens" when operations reproducing elements create a lasting difference in the world between the occurring operations themselves and the "everything else", that becomes the environment of the system. Thus, a system is a difference that makes a difference (Spencer Brown, 1969), a difference reproducing itself by means of a recursive network of operations.

If we take another perspective, looking not to what a system *is*, but to what a system *does*, it is possible to observe that all systems that produces themselves as a difference are *autopoietic* (Maturana & Varela, 1979); autopoietic systems consist of operations of reproduction of their elements within the network of their elements. The operations are not controlled by the environment, otherwise there would be no difference between system and environment; however, they can happen under particular conditions; their success depends on its viability in its environment. But these environmental conditions exist for the system only when the operations happen: the autopoietic system and its environment arise together.

Consciousness is a type of autopoietic system; its mode of operating, that is, the mode in which it reproduces itself by reproducing the difference between it and the environment, reflects the mode of all other autopoietic systems: it consists of the reproduction of thoughts through the network of thinking-forming consciousness. Thoughts are not "things" but events or, in other words, operations happening in time during an autopoietic process; that implies, against post-Cartesian philosophy, that there is no "mental substance" but a continuous production of thought as the output and the precondition of self-referential operations.

It comes out an interesting, double-faced, reality: as only a network of thoughts, which ia outside the control of society, can determine individual actions, each individual is likely to start having coordination problems with other individuals. If individuality means autopoiesis of thoughts, it is necessary to explain how coordination among autopoietic individuals is possible; here, is where the concepts of media, forms and structural coupling arise.

1.2 The concept of structural coupling

Coordination between individuals is basically a coupling of constructions: Alter(ego)'s construction of action and Ego's construction of understanding. When Alter's action is understood by Ego, it is an *utterance of information*; only when Alter defines his or her world through action, Ego becomes able to construct autonomously (to *understand)* both the motives for this action and the meanings realized as information through it.

Thus, according to Luhmann (1992), communication can be defined as *the unity of utterance and understanding that produces information*. It is necessary *both* that something be said by someone (Alter) *and* that someone (Ego) understands what is said and that it is said by someone. Alter's utterance and Ego's understanding form a "unity" because they happen in a unique event, the event in which Alter says something and, simultaneously, Ego understands *that* Alter has said something (attributing motives for it) and *what* Alter has said (information).

The relevance of understanding motives comes from the necessity to attribute responsibility for the utterance; without such an attribution, Ego cannot refer to Alter's utterance, and then communication is not realized: there would be only perception. Information is not the product of utterance alone, because it exists *in communication* only if Ego understands it. For this reason, a single consciousness can neither produce nor control communication: it can neither produce nor control the unity of utterance and understanding. Communication is produced on the basis of other communication. A new communication refers to utterance or information, and in this way it marks a connection to previous communications. Consequently, a network of communications is produced. Any communication is produced through its reference to previous communication, not to individual meaning: in this way autopoietic, self-referential social systems are produced, with individual bodies and consciousnesses in their environment.

Communication and thought are simultaneous but not overlapping. They are produced in different kinds of autopoiesis. Thought and communication are different operations of construction of reality; representation (thought) and narration (communication). Social systems and psychic systems are autopoietic systems in each other's environments that exist simultaneously in the world.

The relationship between thought and communication can be defined as *structural coupling*, based on operations of *interpenetration*. According to Luhmann, *penetration* is the way one system makes its complexity available to another one while remaining in its environment. Interpenetration means that both of the systems penetrate: psychic system penetrates into communication and social system penetrates into thought. Penetration, and interpenetration, are special kinds of "contact" between systems, produced in time, that is, in a single event. Thoughts and communications are events that do not last; on the contrary, they are events that continuously disappear, reproducing the

system only in their continuous happening and disappearing. Only their quality of being events makes autopoiesis possible: since it disappears immediately, any thought can be followed by another thought and any communication can be followed by another communication.

In communication we observe an event of penetration; penetration is based on the simultaneous happening of one communication and one thought. Communication is an event of penetration because any utterance and any understanding coincide with thoughts. When their thoughts coincide with understanding and utterance, psychic systems penetrate into communication. In penetration, the single operation of the penetrated system (social system) coincides with the single operation of the penetrating system (psychic system), while the two systems remain separated. There is coincidence between communication and thought, but communication remains a social operation. It remains an operation of the social system because only the network of communication of this system assures its production (autopoiesis). Communication cannot be produced inside the psychic system because in the psychic system there is no difference between utterance and understanding (there is no Alter ego inside Ego). Rather, communication is an environmental *perturbation* for a psychic system. The concept of perturbation indicates that something happening in the environment is simultaneously constructed in the system: the system is "perturbed" because it cannot avoid considering what is happening in its environment.

1.3 Media/form

Social perturbation is not simply undifferentiated "noise" because it has a *form.* The form is a marked boundary separating two sides: one side is what is indicated, and the other is what is distinguished from the first. Thus, the question is: what is a form?

In order to answer to this question, Heider (1959) offers a theory of mediation that is compatible with our purpose. According to him we can say that a medium is a loose coupling of elements, e.g. light or sound that in them are invisible. When light waves run through the air, the rays are relatively unaffected by this substratum. But when a solid object reflects them, e.g. a stone, they are coordinated with the object in a special way: you see the stone and not the light. The object can be said to print itself into the medium as a *rigid coupling*, which is perceptible as a figure on a ground. Heider makes a distinction between a medium plan and a thing plan; so the things are perceptible at a distance only through media: you can see them, smell them, and hear them.

Already at this point of theorizing we have left the idea of transmitting and started on the theory of differentiating. You must differentiate between what is ground and what is figure. In this constructivist conceptual framework, perception is not an adequate reflection of the surrounding world but system internal construction: according to Maturana and Varela (1980) there is no transmitting of data but an ability to differentiate figure from ground on the basis of different media.

Starting from Heider's distinction, Luhmann abstracts the difference between medium and thing by replacing the concept of *thing* with George Spencer Brown's concept of *form*. This distinction makes it possible to use the theory for analysing what *system internal construction* is, and to include the different media as a variable in the social reproduction.

Spencer Brown (1969) defines *form* as the distinction between indication and distinction. Construction of a form means to *draw a distinction*; only by drawing a distinction can one be able to indicate something. Inspired by Baecker (1999), we can say that a distinction contains everything: the indication that the distinction makes, the non-indicated rest of the world (which the indicated is distinguished from) and the distinction itself, separating the states indicated from the states non-indicated. Now we come closer to what construction is; it is always a result of the process of drawing distinctions. And, going a bit more further, we come to another question: what is the consequence of drawing distinction? Here, is where *meaning* come about.

According to Luhmann (1995: 74), who takes the concept from phenomenological philosophy (Husserl, 1973) also *meaning is a form*, namely the difference of actual and potential. But, as a sociologist, Luhmanm adds to the conscious level of meaning construction the social level; if meaning is the difference of actual and potential, in the sociological perspective what is said must be differentiated from what is not said but could have been said, and in this way gets meaning from this simultaneous representation of the actual and the potential.

Social construction of meaning in society maybe understood as the construction of *social forms*, that is, of distinctions that orient communication by marking two sides (e.g. true/false, right/wrong, conformity/deviance, man/woman etc); any communication is primarily oriented to a form marking the meaning of information produced in other communications: "I define communication as a unity of utterance and understanding" (true/false), "How much is it?" (paying/ not paying) etc.

Furthermore, there are always social forms that concerns the *meaning of contributions,* marking the meaning of individual participation in communication (utterances). The speaker (or writer) may be a parent, a teacher, an economist, a politician, or any other *role*; the speaker (or writer) may also be Paul, Beth or any other *person.* The role or the person speaking are further orientation for communication. From the perspective of functional-structuralism, both social forms that concern the meaning of information and social forms that concern the meaning of utterance are social *structures*: structures select among possible communications and permit connections among communication. For instance, a communication can refer to another communication because the latter is indicated and distinguished as true or false, said by Paul or Beth, by the teacher or Dad. During participation in communication, Ego necessarily understands social forms; in understanding utterance and information, Ego necessarily understands their social forms. *Structural coupling*

means first of all that a system presupposes specific forms in another system (in its environment) and relies on them.

Social forms are the viable structures that allows a psychic system to penetrate into communication; the consciousness' need of social forms does not mean that communication controls the psychic system; Ego thinks autonomously when he or she participates in communication; perturbations of social forms are psychic constructions. The socially formed perturbation of thought is just the *first step* of structural coupling: individual thinking continues beyond the event of understanding, in an autopoietic network of thoughts. The simultaneity happens only in a single event, and is immediately followed by the differentiation of systems. Therefore, a thought has assumed a narrated truth, and this is the starting point for autonomous construction in further thoughts referring to it.

When penetration vanishes, consciousness can construct the meaning of social forms. Ego thinks about what he or she has understood in a specific and unique way, in his or her autopoietic process. In fact, in his or her participation in communication, Ego autonomously *thinks* of true and false, as they are narrated in communication and thinks of Paul, Beth, the teacher or Dad who is narrating them.

The *second step* of structural coupling is the differentiation of psychic and social systems. Differentiation means that the coinciding single communication and thought follow their own connections in different systems.

Social influence can be explained only through structural coupling, that is, through a sequence of constructions: first perturbation (coincidence) and then meaningful information (difference). The effects of socialization come not from the "length" of penetration but from the quality of the psychic forms. The construction of psychic individuality, of a consciousness, occur through autonomous representations that follow these events of communication because any consciousness is not a "trivial machine" that "internalizes" social forms (von Foerster, 2002). Communication cannot determine the psychic forms because it cannot happen inside the psychic system; a common mistake to avoid is the confusion between a simultaneity in an event and a "passage" of lasting meaning (information) from environment to system.

The basic psychic operations permitting structural coupling are a *first-order construction* (understanding of perturbation) and a *second-order construction* or *construction of a construction* (construction of information). The first-order construction happens in the coincidence of a communication and a thought: in the psychic system a "reality" appears as perturbation in consequence of penetration. The second-order construction is a construction of the meaning of this perturbation, which is transformed into information. Ego constructs a meaning thinking of his or her previous thought (coincident with communication). This second-order construction happens with

the differentiation of consciousness and communication, that is, of individual and society (Baraldi, 1993).

2. The evolution of media, the evolution of improbabilities

Thus, a topic of a theory interested in the relationship between individuals and communication would be how psychic structures are coupled with the perturbing social structures; the sociological systems theory of Niklas Luhmann offers a theory explaining the function of media in realizing this social dimension.

Consciousness systems and communication systems, the individual and the social, are operationally closed systems; however social systems must be linked to consciousness and nothing else: while communications cannot perceive and needs to be irritated by consciousness. For its part, consciousness could work without communication, but only if it has experienced communication and has socialized itself.

Luhmann's theory explains that the structural coupling between consciousness and communication is an *improbability* made possible by the improbable evolution of media of communication. In particular, Luhmann includes three different media of communication, seen as improbable evolutionary developed answers to the main sociological improbability, that is, the formation of society on the basis of autonomous and operationally closed consciousnesses.

Starting from a zero point of evolution, Luhmann (1995: 158) notices that it is "*improbable that ego understands what alter means, given that their bodies and minds are separate and individual"* (first improbability), *"It is improbable for a communication to reach more persons than are present" (second improbability), "Even if communication is understood by the person it reaches, this does not guarantee that it is also accepted and followed*" (third improbability).

The answer to the first improbability is *language*: it is through the same use of signs Alter and Ego can be reinforced in the apprehension that they mean the same thing. Language is not meaning but has the function to generalize meaning with the help of symbols (Luhmann 1995: 94). The connection between Alter and Ego at the level of psychic meanings of social perturbations is only possible because of language. The medium of language is the first type of medium that evolved to help overcome obstacles that impede communicative connectivity. Language makes it probable that understanding will occur, in spite of the fact that communication involves the participation of isolated, operationally closed psychic systems.

Language helps the structural coupling between consciousness and communication. With language, both communication and consciousness become much more complex: communication learns to communicate about communication and consciousness learns *to form episodes* through the use of

linguistically formed thoughts. The ability means that the consciousness can differentiate and discontinue operations.

Figure 1, below, shows the media/form ladder from which emerged the medium of language. From the medium of acoustic perturbations (sound), language makes it possible to produce the form of meaning (which requires a structural between communication and consciousness). A form always demands a medium, and what is a form in one medium can itself be a medium for further formation. An analogy offered by Lars Qvortrup (1998, cited in Taekke, 2003) sees plastic as the medium of the form Lego and Lego as the medium for the form Lego-house.

Figure 1

Sound (media)
Phoneme (form in the media of sound, media for the form of)
Morpheme (form in the media of phoneme, media for the form of)
Word (form in the media of morpheme, media for the form of)
Sentence (media for the form of meaning through structural coupling between communication and consciousness)

The evolutionary success of language increases complexity, generating new improbabilities; in particular, language makes it possible the structural coupling between consciousness and communication by means of symbols (forms in the media of sound), generating a second level of improbability, that requires a second improbable evolution of a new medium: the improbability of reaching people outside the present physical sphere,.

The answer to this second improbability consists of by *the media of dissemination*: writing, printing and electronic broadcasting.

With the first dissemination media, the optical medium of writing it was possible to differentiate between interaction and society: the physical compresence of participants ceased to be a presupposition of understanding. With writing, the storage capacity increased and the social units enlarged too. As disseminating media evolved, they strengthened the potential of communication to reach and involve more and more participants. Media of dissemination make it probable that communication reaches an absent audience of addressees. After writing, the printing press, radio, television and the Internet are familiar media of dissemination. With regard to the firsr medium of dissemination, writing, figure 2 illustrates the media/form ladder that, from the medium of visual perturbations (light) leads to the form of meaning (which, once more, requires a structural between communication and consciousness).

Figure 2

Light (media)
Letter (form in the media of light, media for the form of)
Word(form in the media of letters, media for the form of)
Sentence (form in the media of word, media for the form of)
Text (medium for the forms of meaning)

When communication is limited to those who share time and space, it is typically bounded by narrow social controls, memory of context, normative expectations and cultural pressures. However, advances in dissemination media invite communication to escape these bounds. The evolution of media makes the structural coupling between individuals and society more complex, generating new improbabilities that require new improbable evolutions. In particular, as the possible range of communication increases, the chances that specific contributions will be accepted decreases.

The new improbability consists in the acceptance or "success" of increasingly differentiated communication, and *success media*, the third type of communication media, are the answer to this improbability. Success media answer the question of the improbability of the acceptance of the premises of communication, describing how communication has effect in a more complex and differentiated society. To do this, they have to solve problems with combining selection and motivation by employing a semantic matrix intimately connected with the reality of personal experiences, that is, employing social forms that can perturb consciousness whose meanings, however, is an individual psychic construction.

In this way, language, artifacts for dissemination, and social, semantic structures can be seen as different kinds of media influencing the social; we have reached a crucial step, where the evolution of media and social complexity interacts with digital technology.

Language emerged and makes possible the storing of knowledge. With language humans began emancipation from biologically determined social behavior and started to structure co-operation dependent on meaning. However, in an oral culture, knowledge has to be constantly repeated or it will be lost; with optical medium of writing it was possible to differentiate between interaction and society and alternatives could be presented. The storage capacity increased and the social units enlarged too.

With electronic media, which are the most complex type of dissemination media, the production and the consumption of media is easier than it is with writing, or the printing press, because with

electronic media, for instance television, it is as there was no code at all except from the code of language itself.

Electronic media gives the ability to be in a parallel space even if, with the first electronic media, radio and television, being in media space is rather passive: you can change the channel but you cannot alter the forms in the medium, just watch them.

With digital technology, on the contrary, it becomes possible to create, store and share both acoustic and optic constructions in and through the digital media. Figure 3, shows the capability of digital media to absorb and reconstitute other communication media (language, writing, images), creating the possibility of more complex forms of meaning.

Figure 3

Absorbed communication media (language, writing, images), encrypted and decrypted in a digital code (media for the form of)
Multimedial forms (medium for the forms of meaning)

3. Social networks

3.1 Social networks as forms in the digital medium

While speech takes form within a medium of acoustic energy that structurally couples speaker and listener, while writing takes form within the medium of light that structurally couples author and reader, Web 2.0 uses electricity and the digital medium to structurally couple computers that operate according to programs that reproduce communicative utterances.

Among these programs, social networks are networking programs designed to make friends and influence people, supporting selective online interaction between matched participants; social networking software contributes to the differentiation of social networks, that we may define, using the distinctions of the media/form theory outlined in section 1.3, as forms in the technological medium of digital communication.

Social networking software instruct new participants to create a *profile*, *writing themselves to being*, associating his or her person with cultural icons, celebrities, places and popular media resources. The profiles list their names, ages, geographic locations, interests, relationship status, and other details that can easily be inserted into a form or template. Profiles, that is, online persons, represent an output of the social networks and the elements of the social networks. Individuals, what is behind the profiles, are in the environment of the social networks. The social network observes a unity in difference that is represented by all of the users, while non-users, without any reference to their condition as individual in society, are meaningless.

The social networks exist as bounded autopoietic systems that operate within the new ether of interactivity supported by Web 2.0 and its technical innovations, producing themselves by meaningful organizing its own elements.

3.2 Persons in the social network

If we use the distinctions of media/form theory, we may say that the incredible impact of social networking sites appears to be related to the capacity of networked computers to selectively organize tight couplings of information from loose elements that are available within a constantly expanding digital medium of virtual data.

Participants in a social network site, and sociologists, may observe the system identifying and organizing its elements (profiles), selecting them and relating them to other elements to make temporary and contingent assemblies (friends).

Regardless of the type of communication medium, participants in society are able to make meaning with communicative forms because they recognize the selectivity of a tight coupling and know that it could have been different. As they read, type and click, online persons/profiles reveal that the digital medium of Web 2.0 has changed their ability to organize the complexity of communication, to reach and be reached by others, and to inform themselves with the self-reference of society; when profiles construct order (meaning) out of noise, distinguishing between friends and (online) persons, they demonstrate the cultured ability to differentiate information and utterance.

Profiles establish and manage connections, creating friends out of profiles. However, from a social constructivist perspective, persons, and online persons, are not "things"; rather, they are the outcome of the establishment and manage of social connections. Luhmann suggests that while persons, their consciousnesses and their bodies, are a condition for communication, it is communication that creates persons (and profiles), by providing addresses from which they may participate in society (Luhmann, 1995). A person is constituted for ordering behavioral expectations that can be fulfilled by his/her and his/her alone, and so it is a profile. Being a person requires that one draws and binds expectations to oneself with the help of one's psychic system and body, including expectations about oneself with regard to others.

Thus, persons, and profiles, are collages of expectations, functioning as points of reference for further selections within the social system, also when the system is a social network; when we refer to profiles who use communication to locate and contact one another, we presuppose that communication has already raised reciprocal expectations of personhood. As they do in their social worlds, with regards to different social contexts, profiles learn to expect that different context within the social network will include specific kinds of persons who participate in specific kinds of communication.

The most successful social network sites are comparable in terms of their functionality: they support selective online interaction between matched participants, instructing new participants to create a "profile", that is, their online personhood. The profiles list their names, ages, geographic locations, interests, relationship status, and other details that can easily be inserted into a form or template.

Making use of the ability of the digital medium to absorb and reconstitute other communication media, a profile may attach collections of photos, music and video clips to a page. In this manner, an individual user associates his or her online personhood with cultural icons, celebrities, places and popular media resources. The work of assembling artifacts builds up the complexity of a profile page, increasing the selectivity and variety of expectations that may be attributed to the online profile by others.

As she or he creates a profile on the social network, an individual becomes a person in the sense that she or he may begin to practice digitally mediated friendship. Going beyond Luhmann's observations, not only do participants claim personhood by gaining an address from which to participate in communication, they also confirm and make evident the personhood of profiles with whom they are networked. Thus, we may describe the form of a friend in the social network as the difference between friend and person, and we may say that the meaning of friendship is produced in the processing of this difference. A click produces friendship by bringing a specific person to the surface, up from the digital depths of available people.

4. Web-based groups in the social network

4.1 Content-centered groups

Digital medium both increases and reduces the complexity of communication, destroying variety with variety. Every Ego with a profile exists as a person for unknown Alters, lurkers included. The system stands by, waiting for participants in the network to be motivated by their own projections of differences between people and their communicative utterances. In fact, the more a social network is able to recognize every one of its profiles as an available participant in communication and every archived utterance as a potential piece of information, the more a social network site is attractive for actual, or potential, users.

Digital technology is the prerequisite for the ability of any social network to create the complexity which, for its part, is the evolutionary prerequisite for the emerging of networks of friends. However, technology is also used to selectively reduce the complexity it creates, with unparalleled speed and reliability: steered by the clicks of users, the invisible machine transforms input into output according to a networking program designed to make friends and influence people.

It emerges a three-tiered picture: 1) the social network as a form in the medium of society differentiated by the technological medium of digital communication and social networking software, 2) Ego-centred networks of friends as a forms in the medium of the social network differentiated partly by the digital technology, and partly by the networks' border of meaning and, 3) the single communication as a form in the medium of the network of friend, producing network's border of meaning, which is its precondition, as its output.

If we examine the larger social network, Facebook, which borders are reaching the borders of society (with the exclusion of areas still without electricity and telephone lines), networks of friends are not the only form that may emerge in the medium of the social network; another social formation are *web-based groups.*

Differently from networks of friends, web-based groups are not Ego-centred but *content-centred*: profiles gather in a group attracted by a specific issue, a popular person, a stream of discussion, creating bounded social system within the medium of profiles.

It is widely acknowledged that web-based groups represent a crucial social system in our society; for instance, the use of web-based groups to spread information, to co-ordinate protest activities, to debate on protest issues, to integrate or disseminate mass media coverage of protest events seems to characterize today's political participation (Segerberg&Bennett,2011). Developing Mark Granovetter's sociological concept of "weak ties networks" (Granovetter,1983), scholars in the field of new media suggest that, if web-based groups are likely to lack strong networking patterns, they can become channels for opinion making and public reasoning within online active audiences (Honeycutt and Herring, 2009; boyd et al., 2010).

As any other type of social system, web-based groups produce, and are produced by, a single operation, that is, communication. Joining or leaving the group, launching new topics of discussion, criticizing or praising the contributions of other members, all of these operations represents events of communication, as soon as an Ego (another member of the group) observes them understanding information and attributing motives for utterance.

For this reason, our discussion on the web-based groups as social systems will focus now on the operation which represent the output and at the same time the input of web-based groups: communication. In particular, we look at any single communication in the web-based groups as a form in the medium of the group, either producing the border of meaning as it is or trying to modify it by new meaning proposals, hoping to get them *conditioned* (making it a condition for further communication). When a group is born, it is differentiated in the *factual dimension* communicating something separated from something else; its borders are condensed by actualizing and confirming proposals of meaning, but also by refusing them: to annul a proposal of meaning is to create memory of it as not part of the system. Seen from the *temporal dimension*, it is the past that gives

the horizon of possibilities for actual selection of understanding and for the expectations for the future.

The social network is the wide-ranging concept for all the groups; it is a form in society differentiated out by the technology; the single group is a form in the medium of the social network, differentiated party by the technology and partly by the group's border of meaning. Figure 4, below, explains through a media/form ladder, the process of self-referential distinctions that, starting from the medium of society to communication processes as forms within web-based groups.

Figure 4

Social networks are forms in the medium of society, differentiated by the technological medium of digital communication and social networking software
Web-based groups, are bounded social systems that operate within the medium of social networks, supported by Web 2.0 and its technical innovations and differentiated by events of communication (profiles' choice to join and contributions)
Web-based groups are media for the form of the single communication. The single communication is a form in the medium of the web-based group (difference between actual and possible communication)
Recursive communication is the output, but also the input of the web-based group, producing the system's border of meaning: 1) condensing what has been said before, actualizing and confirming it *and/or* 2) negating a new proposal of meaning, creating memory of it as not part of the system

4.2 Web-based groups as social and temporalized system

For autopoietic social systems, the environment is necessarily a source of irritation, because it can't be controlled by the operation of the system; in a more accurate way, we should talk of self-irritation asthe environment, which is produced by the system, becomes informative as it is observed by the system, by means of the re-entry of the distinction between system and the environment in to the system.

Autopoietic social systems are unstable, they produce their own instability, which is a presupposition for their evolution. This is also true for web-based groups, which are continuously irritated by the environment they produce, condensing their border communication after communication.

The environment of a web-based groups consists of society, including its members; indeed, the most important source of irritation for a web-based group is the observation of its members. While the group and its members are structurally coupled, they represent two different forms of

autopoietic systems; the groups is a social system of communication, the single member is a psychic systems of thoughts.

Since the group penetrates in the consciousness of its members, that is, since the meaning of the group is created by one or another of its members, the conditions for the irritation of the group are created. Consciousness produces meaning out of communication, drawing the distinction between what has been done by a specific Alter and what else could have be done in that situation by the same Alter, or by another Alter; this is a self-referential process in which, after the initial coupling with the event of communication, thought follows thoughts in a way that is opaque to group. The group cannot control the difference it makes for consciousnesses of its members; thus it cannot control their reactions.

When, following the penetration of the group in a consciousness, this consciousnesses produces the meaning of this irritation and communicates about it, consciousness penetrates the group; a contribution is uttered, understood and reacted to (or not reacted to, if a reaction of many kind was expected): all of this events represent irritations, and the group must produce new semantics to cope with it, that is, defining it in relation to everything else, which frequently is a rather confrontational process.

In particular, a web-based group needs to preserve its borders, otherwise the distinction between the group and the environment, therefore the group itself, would vanish. In particular, while, in the ordinary activities of the system its border of meaning is implicit, if somebody tries to get a meaning proposal in opposition to it, this border will be defended strongly, making it explicit.

It is of the greatest importance to notice that, if we observe the empirical social processes in the media of the social network, it is possible to recognize that web-based groups may reach (and indeed reach, otherwise they would perish), a level of internal complexity that allows them to produce self-irritation, to actualize and confirm the borders of meaning: in complex web-based groups, there are very unpopular members who are not thrown out permanently, giving other members the possibility to reproduce the border, getting identity out of it.

When an unpopular member offers a proposal of meaning i opposition with the semantic of the group, the group irritate itself, and such irritation is the condition for the *re-entry* of the distinction, separating the system from the environment, into the system that appears by producing it (Spencer Bronw, 1969): when a member says something in opposition to the border of meaning the others gets the possibility to defend it, making it explicit.

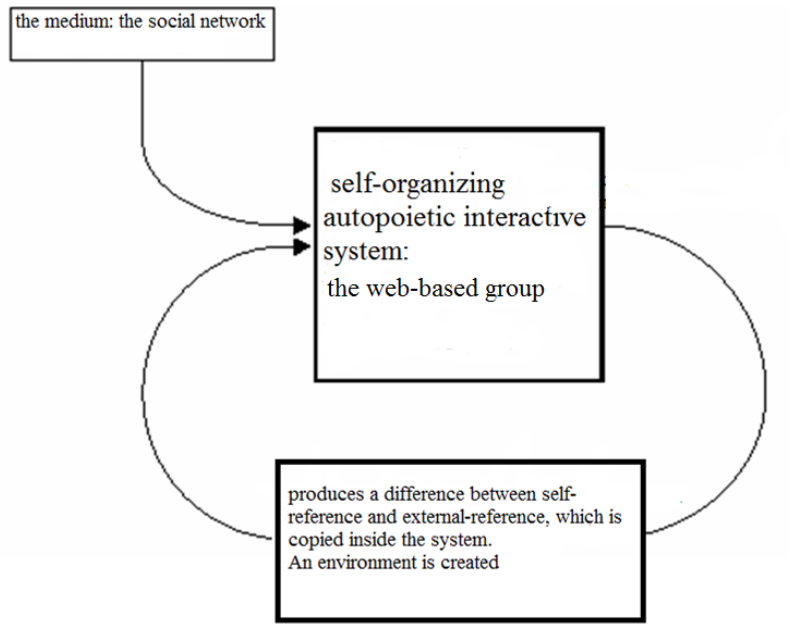
Thus, alongside factual and temporal differentiation, a distinction is produced also in the *social dimension*, between an environment that consists of what does not communicate, for instance psychic systems, or stones, and the group as a system of communication. With self-irritation and re-

entry, this difference is copied into the system, as a distinction between self-reference and other-reference.

Now, we can see how the web-based group is differentiated on the basis of a single operation, communication, in a factual, temporal and social dimension, becoming an autopoietic systems that reproduces itself by means of the output of its own operations.

Figure 5, below, illustrates the process of self-referential autopoiesis of a web-based group in the Facebook social network. From the perspective of the media/form theory, the group is understood as a form in the medium of the social network.

Figure 5



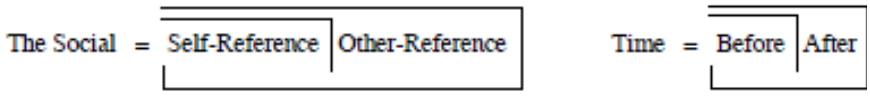
The process documented by figure 5 is the re-entry of the distinction that separates the system (the group) from the environment into the same system (the group), that appears by producing the distinction. The distinction between the system and the environment, that is, its border of meaning, is copied into the system by the system, when a member says something in opposition to the border and the others gets the possibility to defend that border, making it explicit.

Thus, we see how the autopoietic web-based group is differentiated by means of its own operations (communications). Iteration of communication produces decisions, conditionings and semantics, that is, the condensation and confirmation of the group as a form in the medium of the social network.

With the operation of re-entry, the distinction between self-reference and other-reference provides with reference which embodies the unity of the system. Yet, this distinction also embodies the closure of openness, since reference keeps coming back to itself while constantly having to account

for the other. As shown in figure 6, when the distinction between self-reference and other-reference is crossed by the distinction between before and after, you end up with *temporalized systems*, that take into account their history while they operate.

Figure 6

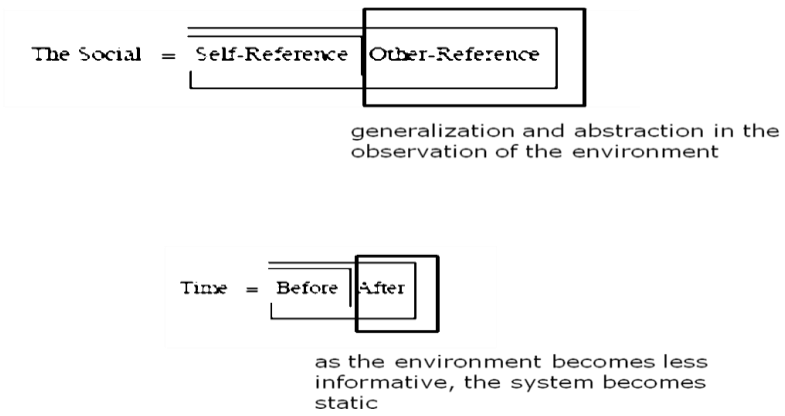


However, web-based groups, as all complex autopoietic systems may forego their complexity; evolution is not necessarily a one way process from low complexity to high complexity; indeed the other way round is possible: 1) when a system sticks to its unity without paying attention to the other side of the distinction, the environment, 2) when a system becomes *seemingly* static by assuming events of all kinds not to change a before into an after.

Web-based group tends to condense their border of meaning, which represent the basic operation for their reproduction as a unity in the environment; while this operation preserves the autonomy of the system, it exposes the system to the risk of a drive which could lead not to reflection but, rather, to generalization and abstraction.

We think that this risk a serious one, which consequences cannot be underestimated: generalization and abstraction imply that all the details and specifics, the distinction of which from other details and specifics would be nothing less than the condition to develop intelligence, are lost. In fact, as illustrated by figure 7 below, for a subject (included a web-based groups in Facebook), it takes the distinction from an environment to be able to reflect on itself; the system as whole tends to lack intelligence since it fails to reflect on an environment.

Figure 7



Conclusion

Intelligence starts when an entity is able to take its own lack of knowledge into account and to search for the knowledge lacking in other entities which presumably are in a better position to bring forth the knowledge sought. That, too, presupposes the distinction from an environment which becomes the search space for the knowledge lacking. This leads to the surprising conclusion that when a web-based group produces an environment that is generalized and abstract, the difference between a before and an after become less informative, and the system become less intelligent than any of its parts.

A conclusion (among many possible others) we would like to propose about the differentiation of autopoietic web-based groups in the social networks is the following: even in the functionary differentiated society with its millions of social possibilities, even in the space of electronic media, there is always a concrete communication situation that determines the border for what can be said if you want to make a social inclusion. However, the invention of a border is a process that is necessary and dangerous at the same time: it brings about the possibility that the reproduction of the system becomes a pathology of the system itself. Web-based groups offer an instance of the paradoxical relationship between differentiation, complexity and time.

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